

NEW DIASPIDIDAE (HOMOPTERA : COCCOIDEA)  
FROM THE INDO-MALAYAN REGION

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# NEW DIASPIDIDAE (HOMOPTERA : COCCOIDEA) FROM THE INDO-MALAYAN REGION

By W. J. HALL AND D. J. WILLIAMS

## SYNOPSIS

Of the 13 new species described below, 3 belong to the Diaspidini, 5 to the Parlatoriini and 5 to the Aspidiotini.

Examination of a mass of unidentified Coccid material from the Indo-Malayan region in the collections of the British Museum (Natural History) has revealed the presence of a few species apparently new to science. A collection from Pakistan recently sent by Dr. M. A. Ghani to the Commonwealth Institute of Entomology for determination also contained 6 species new to science. Dr. Ghani is to be congratulated on discovering these particularly interesting new forms.

The lettering used in the figures is as follows :—A. Adult female, general aspect. B. Pygidium. C. Dorsal margin of pygidium. D. Pygidium of second stage female.

The holotypes and paratypes are deposited in the British Museum (Natural History).

### *Aulacaspis discorum* sp. n.

(Text-fig. 1)

Scales of the adult female dull white, subcircular or broadly pyriform, convex ; exuviae brown, coated with a film of secretory matter ; situated marginally. Diameter about 1.5 mm.

Male scales not seen.

Length of body of adult female when mounted about 1.2 mm., width 0.9 mm. Widest across the prosoma which is only slightly wider than the metathorax. Prosomal tubercles lacking. Anterior spiracles with a compact crescent-shaped group of about 30 pores ; posterior spiracles with about half this number. Median lobes strongly divergent with their bases in close apposition and joined by a sclerotized yoke ; rounded apically with inner margins very faintly serrated. Second lobes well developed, third lobes present but more squat, fourth lobes, if present, only poorly developed. With pairs of gland spines in the first and second interlobular spaces, in each pair the outer being much the longer spine of the two ; a single spine between the third and fourth lobes, another beyond the fourth and with a group of 5 at the base of the pygidium, and 7 to 9 laterally on the second and third abdominal segments. Three submarginal rows of dorsal ducts, each containing 7 or 8 ducts on segments 3, 4 and 5, and 4 rows of submedian ducts on segments 3 to 6, the innermost row on segment 6 with usually 3 ducts, the other rows with 4 or 5. Segments 1, 4, 5 and 6 each with a well marked submarginal boss. Small groups of short microducts submarginally on the ventral surface of pygidium. Perivulvar pores in 5 groups ; median 7-12 ; anterior laterals 20-27 ; posterior laterals 15-20. Anal orifice near the centre of pygidium.

Holotype. ♀. PAKISTAN : Chharrapani, on roots of *Panicum psilopodium* (Gramineae), 29.i.1961 (Comm. Inst. Biol. Control, Rawalpindi, No. 204).

Paratypes. PAKISTAN : 10 ♀, same data as holotype.

*Aulacaspis discorum* seems to come closest to *A. rosae* (Bouché) from which it differs in the median lobes being in apposition at their bases ; in having pairs of gland

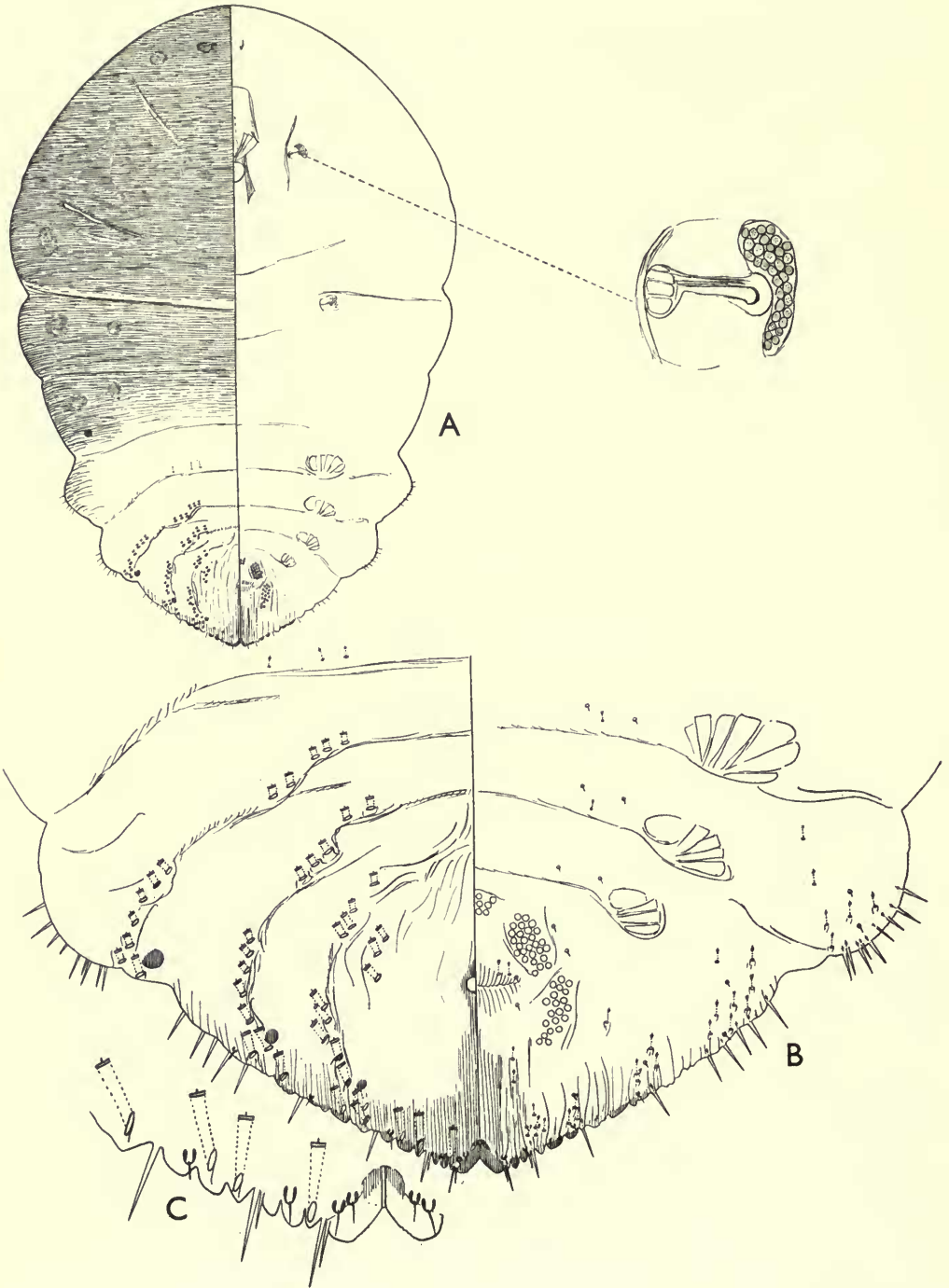


FIG. 1. *Aulacaspis discorum* sp. n.

spines in the first and second interlobular spaces, the outer spine of the pair being much longer than the inner, and in the well marked submarginal bosses on segments 1, 4, 5 and 6. Not one of these features is found commonly amongst the species of this genus.

It seems strange that this species should be found on the roots as all others in the genus are aerial.

***Fiorinia hederæ* sp. n.**

(Text-fig. 2)

Scale of female of the type normal for the genus consisting of the yellow or pale brown enlarged second exuviae overlaid by a white secretory film that extends beyond the exuviae to give a narrow fringe laterally and posteriorly. First exuviae terminal, dark brown, with the covering secretory film worn off in some specimens.

Scale of male not seen.

Adult female, when mounted, membranous, of normal form about 1.1 mm. wide. Antennal tubercles each with a single curved seta and with a prominent membranous process between them. Anterior spiracles with about 5 trilocular pores. Pygidium with all but the basal area slightly sclerotized; median lobes only present, these small of irregular rather jagged outline and set apart by a distance slightly less than the width of one, connected by a narrow sclerotized arc. Pygidium with 4 marginal macroducts on either side and a few microducts submarginally on both dorsal and ventral aspects. Perivulvar pores in 5 groups, average of 7 examples, median group 6 (5-7), anterior laterals 13 (12-16) and posterior laterals 16 (11-22). Anal aperture situated towards the base of pygidium. Free abdominal and metathoracic segments each with 2-5 marginal gland spines with swollen bases.

Median lobes of second stage female retracted into the apex of pygidium, strongly divergent, bases yoked and inner edges serrated. Second lobes well developed, bilobed. Pygidium with 5 macroducts marginally on each side. Three gland spines set on conspicuous tubercles marginally on the free abdominal segments.

Holotype. ♀. PAKISTAN: Murree, on leaves of *Hedera helix* (Araliaceae), 24.ii. 1961 (Comm. Inst. Biol. Control, Rawalpindi, No. 185).

Paratypes. PAKISTAN: 6 ♀, same data as holotype.

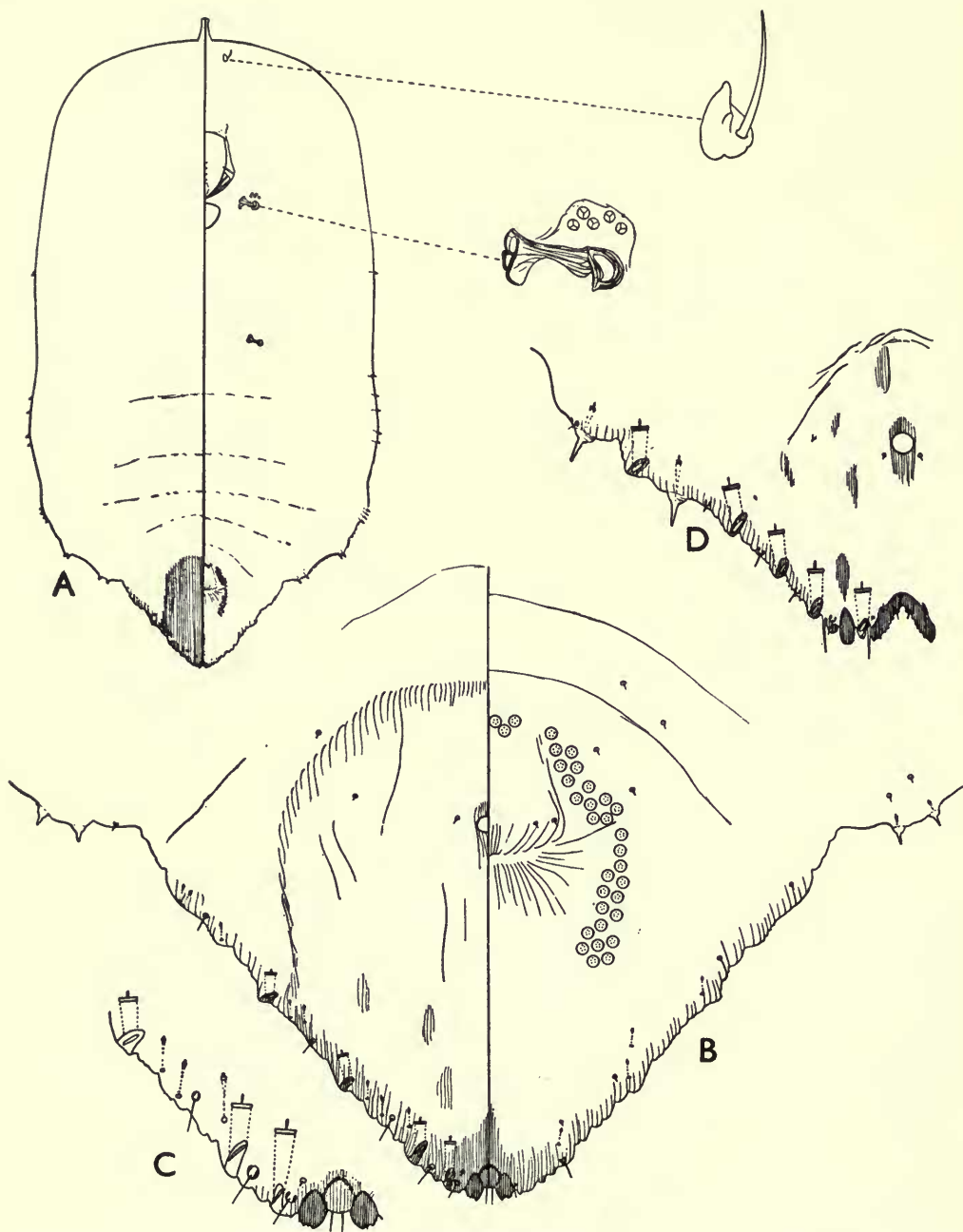
*F. hederæ* is a typical *Fiorinia* bearing a distinct resemblance to *F. kandyensis* Green. It resembles that species in having a well developed interantennal process, in having trilocular parastigmatic pores (*F. chinensis* Ferris has a similar type of pore but it is not generally true of other species in which these pores are represented), and in the number and nature of the pygidial ducts in both the adult and second stage females. The adult of *F. kandyensis*, however, has very much longer setae on the margin of the pygidium than those found in *F. hederæ*, and a shorter interantennal prominence, as well as other small differences.

***Mitulaspis malayana* sp. n.**

(Text-fig. 3)

Scale of adult female low convex, very broadly pyriform, almost circular, and opaque white but usually appearing dark brown owing to incorporated matter. Exuviae set marginally, golden yellow, masked by a thin film of white secretory matter. In some examples the scale shows indications of fluting. Width about 1.5 mm.

Male scale white, rounded at either end, slightly wider about the middle, uncarinated.

FIG. 2. *Fiorinia hederae* sp. n.

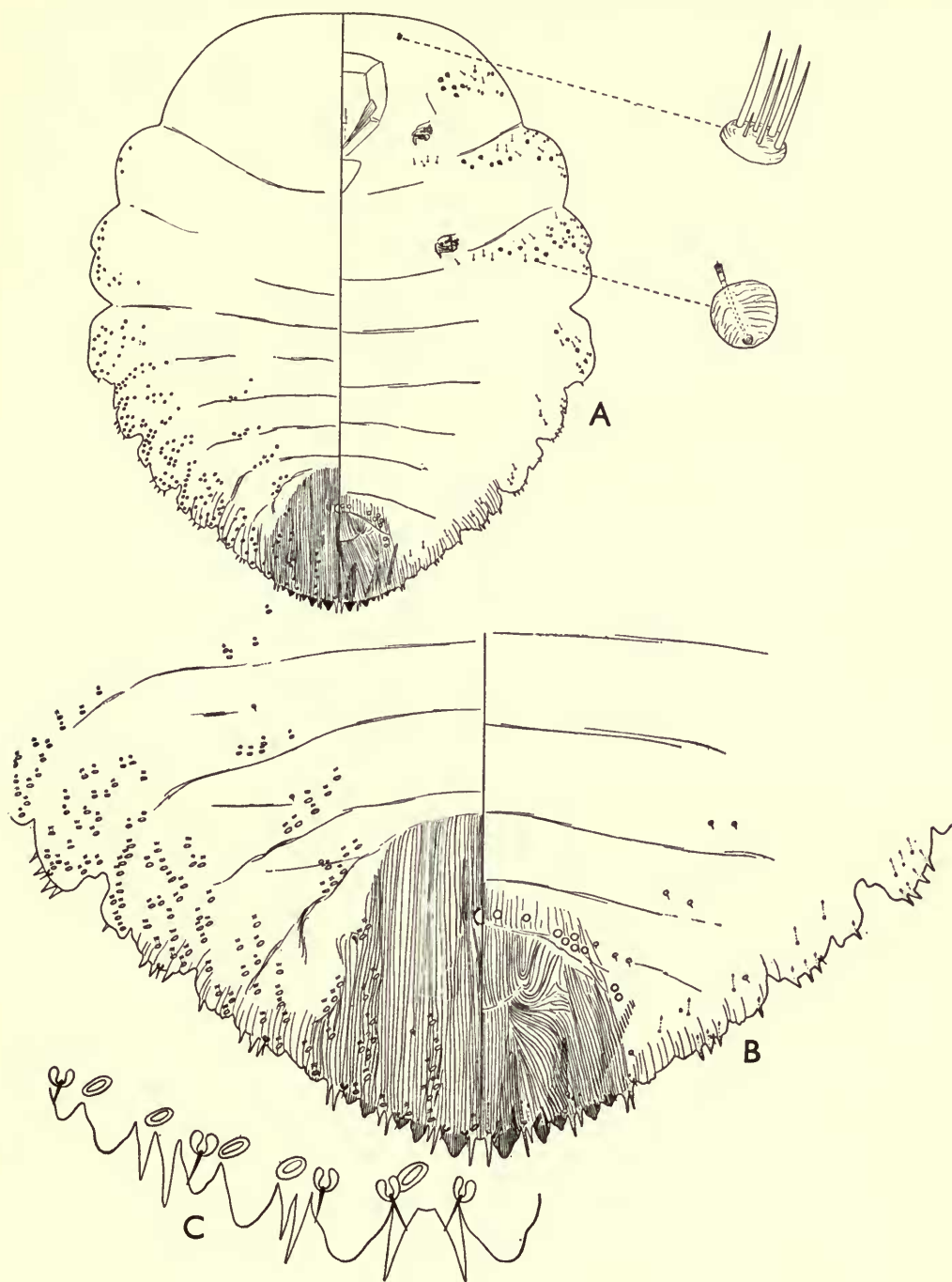


FIG. 3. *Mitulaspis malayana* sp. n.



Body of adult female about 1.0 mm. wide, broadly ovate, membranous with clearly demarked thoracic and abdominal segmentation. Antennae with about 6 subequal stout setae. Anterior spiracles with 8-10 pores, posterior pair with 4-9. Pygidium with a well defined sclerotized central area. Median lobes obconical, rounded apically, set apart by a space about the width of one. Within this space is a macroduct associated with inner angle of one or other of the median lobes. Second and third lobes of similar form, duplex but smaller, with the outer lobule smaller than the inner. Gland spines stout, bluntly pointed, in pairs in the interlobular spaces and just beyond the third lobes. A group of 3 gland spines at the base of pygidium and 3 or 4 marginally on each abdominal segment. Perivulvar pores arranged in a semicircle, groups not well defined but each posterior group containing usually 2 anterior groups with about 5 in each group linked by 1 to 3 single pores. Well defined rows of dorsal ducts running in from the margin on the sixth and seventh segments. Anterior to the seventh segment the pores are separated into submedian and marginal groups, the submedian groups extending as far as abdominal segment 2. Ducts in the marginal and submarginal areas of all segments as far as the mesothorax numerous and scattered. Gland tubercles numbering 3-10 submarginally on the thoracic segments and first free abdominal segment. Anal orifice situated towards base of pygidium.

Holotype. ♀. MALAYA: Kuala Lumpur, on stems of *Cinnamomum camphora* (Lauraceae), 4.v.1927 (G. H. Corbett) (Dept. Agric., Kuala Lumpur, No. 3815).

Paratypes. MALAYA: 1 ♀, same data as holotype. MALAYA: Kuala Lumpur, *Cinnamomum zeylanicum*, 14 ♀, 8.vii.1929 (Dept. Agric. Kuala Lumpur, No. 3964).

Hall (1946) pointed out that this species was not only congeneric with but extremely close to *Mitulaspis funtumiae* (Newstead) described from Uganda on *Funtumia latifolia* (Apocynaceae). It is, however, a much smaller species of quite different shape and unlike *M. funtumiae* it possesses perivulvar pores and gland tubercles on the thoracic segments. In other respects the two species bear a striking resemblance to each other. It is surprising that the only two known species of this genus should have been found in such widely separated areas. One suspects that other species remain to be discovered but whether in South East Asia or in Africa or both is a matter for conjecture.

### *Cryptoparlatoeopsis euphorbiae* sp. n.

(Text-fig. 4)

Second stage exuviae subcircular, reddish brown, within which the outline of the adult female can be seen. Exuviae coated with a thin film of white secretory matter. Diameter about 1.0 mm.

Male scale not seen.

Adult female broadly rounded in front, abdominal segments abruptly narrowed, terminating in a somewhat acute pygidium. Antennal tubercle with a single stout curved seta. Spiracles without pores. Margin of meso- and metathorax lined with gland tubercles interspersed with a few microducts. Pygidium acute with 2 pairs of lobes, median pair set close together but not yoked, rounded apically and falling away laterally, with serrated margin; second lobes of similar form but smaller. Pygidium with 2 macroducts on either side, one in the first interlobal space and the other in the second space if a third lobe were represented. There are 8 long setae on either side, 4 on the dorsal aspect of the margin and 4 on the ventral. Also in the first interlobal space an apically truncated duct-carrying projection with 4 more at intervals between the second lobe and base of the pygidium and 2 or 3 marginally on each free abdominal segment. Both dorsal and ventral aspects of pygidium with a very few scattered microducts. Perivulvar pores wanting. Anal orifice small, set near the centre of pygidium.



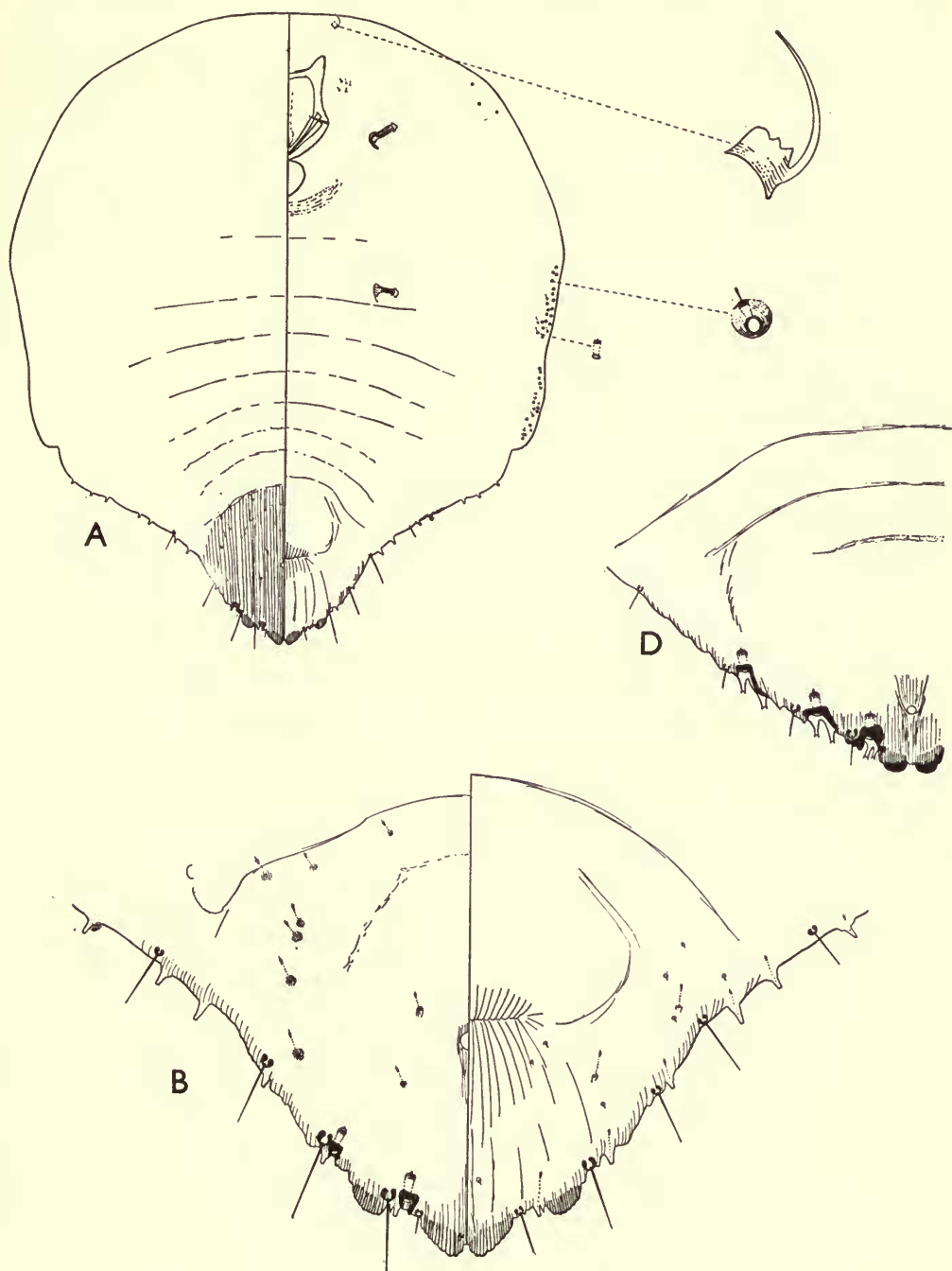


FIG. 4. *Cryptoparlatoresopsis euphorbiae* sp. n.

Pygidium of second stage female with median lobes broad and flatly rounded, with a notch on the outer edge and set apart by about a third of the width of one; second lobes present but poorly developed. With a macroduct in the first interlobal space and 2 more beyond second lobes. Each macroduct associated with a pair of apically truncated gland spines.

Holotype. ♀. INDIA : Marudamalai Hills, Coimbatore, on the flattened stems of *Euphorbia antiquorum* (Euphorbiaceae), 3.x.1951 (T. S. Muthukrishnan) (Agric. College, Coimbatore, No. 29), in association with *Gymnaspsis cassida* sp. n.

Paratypes. INDIA : 12 ♀, same data as holotype.

This species seems to have a very definite affinity with *C. halli* (Bodenheimer), the type of the genus *Cryptoparlatoreopsis* Borchsenius. Balachowsky correctly assigned his *Aonidia tlaiae* to this genus and transferred *Targionia meccae* Hall. He considered that *Cryptoparlatoreopsis* belonged to the subtribe Aonidina although, as he pointed out, it has characters approaching the genus *Parlagena* of the tribe Parlatoriini, but that it differed from that genus in the total absence of gland tubercles on the cephalothorax. It should be pointed out, however, that *P. inops* McKenzie, the type of *Parlagena*, appears to be without such tubercles. The genus *Cryptoparlatoreopsis* may well be a connecting link between the subtribe Aonidina of the tribe Aspidiotini and the Parlatoriini, but the presence of gland tubercles on the thorax and duct-carrying plates or projections marginally, the nature of the marginal macroducts in the adult and second stage females all suggest affinity to the Parlatoriini rather than the Aonidina. The ducts seem to be 2-barred although their structure is obscure and not easy to determine.

### *Gymnaspsis cassida* sp. n.

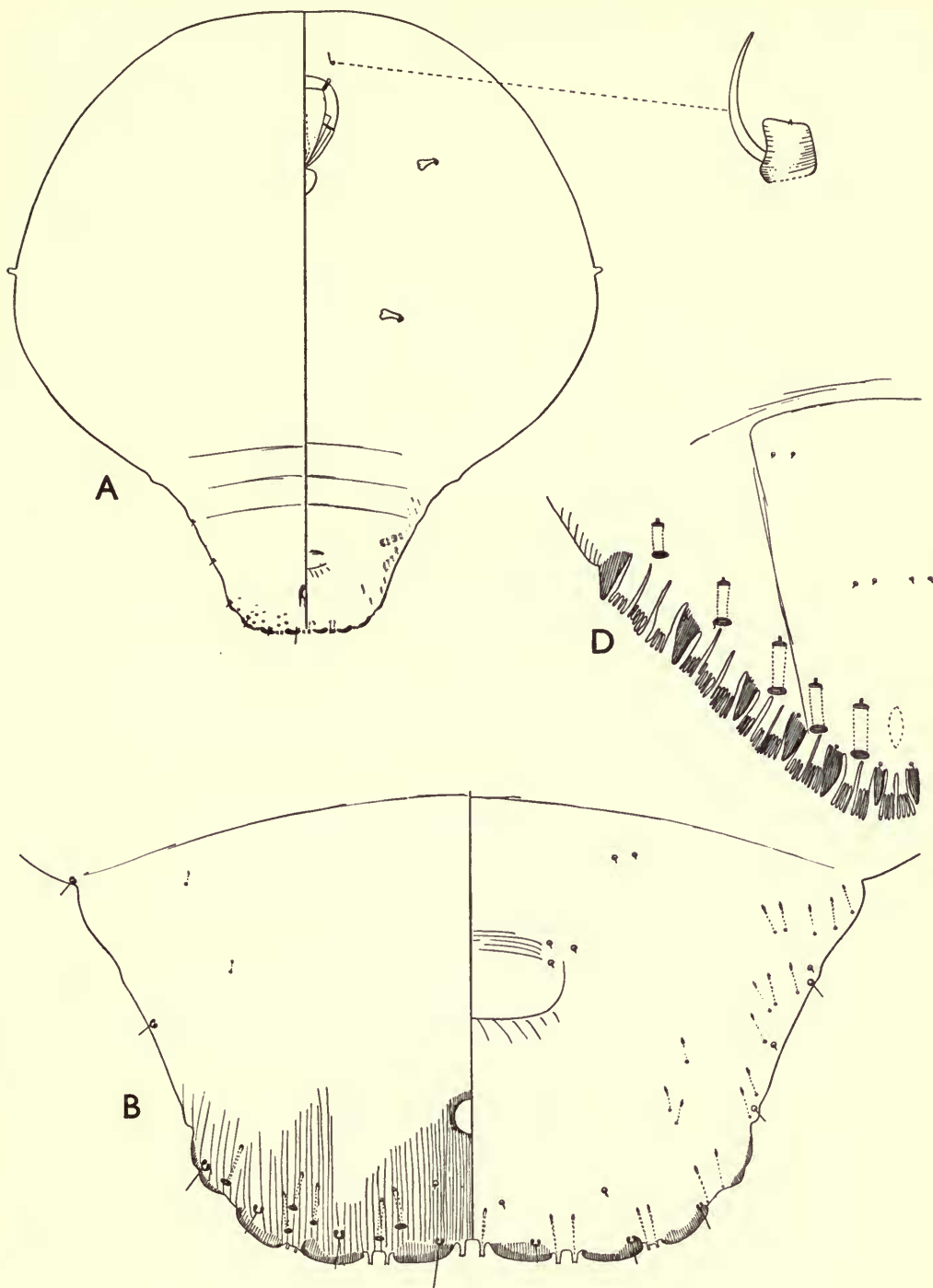
(Text-fig. 5)

Female scale pupillarial, highly convex, anterior portion broadly rounded, posterior half narrowed and flattened apically. Colour black giving way to a deep reddish brown towards the posterior extremity. Length about 1.0 mm., width the same.

Male scale white, subcircular, with conspicuous and rather large black exuviae, sometimes masked by a little white secretory matter.

Adult female when mounted, membranous, widest across the mesothorax, anterior to this flatly rounded, posteriorly abruptly narrowed towards pygidium which is flattened apically. Antennal tubercles carrying a single stout curved seta. A prominent thoracic tubercle present on each side. Pygidium with 4 pairs of lobes all of which are short but very wide and flatly rounded, the median pair being set apart by only a little more than half the width of one. Two short apically fimbriate plates between the median lobes and in the first and second interlobular spaces; in no case do these extend beyond the lobes. Submarginally on the first and third interlobular spaces are 2, 3 and 1 tubular ducts respectively. Anal orifice nearer apex than base of pygidium. Perivulvar pores wanting. Ventral dermis with a few microducts scattered submarginally over basal half of pygidium.

Second stage female heavily sclerotized with a pygidium of the form typical of the Parlatoriini; with 6 pairs of tusk-like lobes. Between the median lobes and in the first two interlobal spaces there are 2 apically fimbriate plates; in the other 3 spaces there are 3 similar plates. With 5 tubular macroducts on either side, 1 in each lobal space except between the median lobes. Anal orifice rather obscure in some specimens, set in from apex of pygidium by a distance about equal to the length of the median lobes.

FIG. 5. *Gymnaspis cassida* sp. n.

Holotype. ♀. INDIA : Marudamalai Hills, Coimbatore, on the flattened stems of *Euphorbia antiquorum* (Euphorbiaceae), 3.x.1953 (T. S. Muthukrishnan) (Agric. College, Coimbatore, No. 29) in association with *Cryptoparlatoeopsis euphorbiae*.

Paratypes. INDIA : 21 ♀, same data as holotype.

This species bears a close resemblance to *Gymnaspis bullata* (Green). The pygidial lobes, however, in the adult female are wider and the median lobes are much further apart in *G. cassida* than *G. bullata*. Green also makes no mention of thoracic tubercles in *G. bullata* nor are they apparent in the type and other preparations available. The second stages differ in that *G. bullata* has two additional macroducts submarginally, duplicating the first and second ducts on each side. The differences referred to above, though small, are consistent and one cannot very well assign the present material to *G. bullata*, close as it obviously is. It may be that when more material comes to hand intermediate forms may be found that will bridge the present gap between *G. cassida* and *G. bullata*. Attention is drawn to the fact that *G. bullata* does not appear to be congeneric with *G. aechmeae* Newstead, the type of *Gymnaspis*, but for the time being *G. bullata* and *G. cassida* are left in that genus until such time as the genus *Gymnaspis* and close generic allies are better known.

### *Leucaspis coniferarum* sp. n.

(Text-fig. 6)

Scale of female elongate and slender consisting of the pale brown sclerotized second exuviae overlaid by a rather thick white secretory film that masks the colour and often the darker brown colour of the terminally placed first exuviae. Length of second exuviae about 1.8 mm.

Male scale not observed.

Adult female when mounted, elongate oval, about 0.7 mm. long, membranous. Antennal tubercles carrying 4 setae of varying length and stoutness. Anterior spiracles with usually 2 pores. Pygidium broadly rounded with 3 pairs of lobes, median pair triangular, set widely apart, second pair squat, rounded at apex and notched on outer edge, third pair poorly developed, squat and broadly rounded. Pygidium without either plates or gland spines but with 5 or 6 microducts on the dorsal aspect submarginally. Anal orifice rather nearer base than apex of pygidium. Perivulvar pores wanting.

Second stage female with broadly rounded pygidium carrying 3 pairs of lobes, median pair tusk-like, apically rounded, second pair similar and very little smaller, third pair shorter but wider. Plates between the lobes and beyond the third pair apically fimbriate. With a macroduct between median lobes and 7 macroducts marginally on each side ; all macroducts set with their axes parallel to the margin. Dorsal aspect with a few ducts of smaller size scattered over the submarginal and submedian areas.

Holotype. ♀. PAKISTAN : Cherat, North West Frontier Province, lying along the needles of *Pinus longifolia* (Pinaceae), 30.iv.1916. (T. B. Fletcher).

Paratypes. PAKISTAN : 5 ♀, same data as holotype. PAKISTAN : Murree, *Pinus excelsa*, 4 ♀, 13.v.1960 (Comm. Inst. Biol. Control, Rawalpindi, No. 199).

*Leucaspis coniferarum* comes closest to *L. loewi* Colvée from which the adult female differs in lacking perivulvar pores, in having larger pygidial lobes of a different shape and much closer together, and in having fewer dorsal ducts on the pygidium.

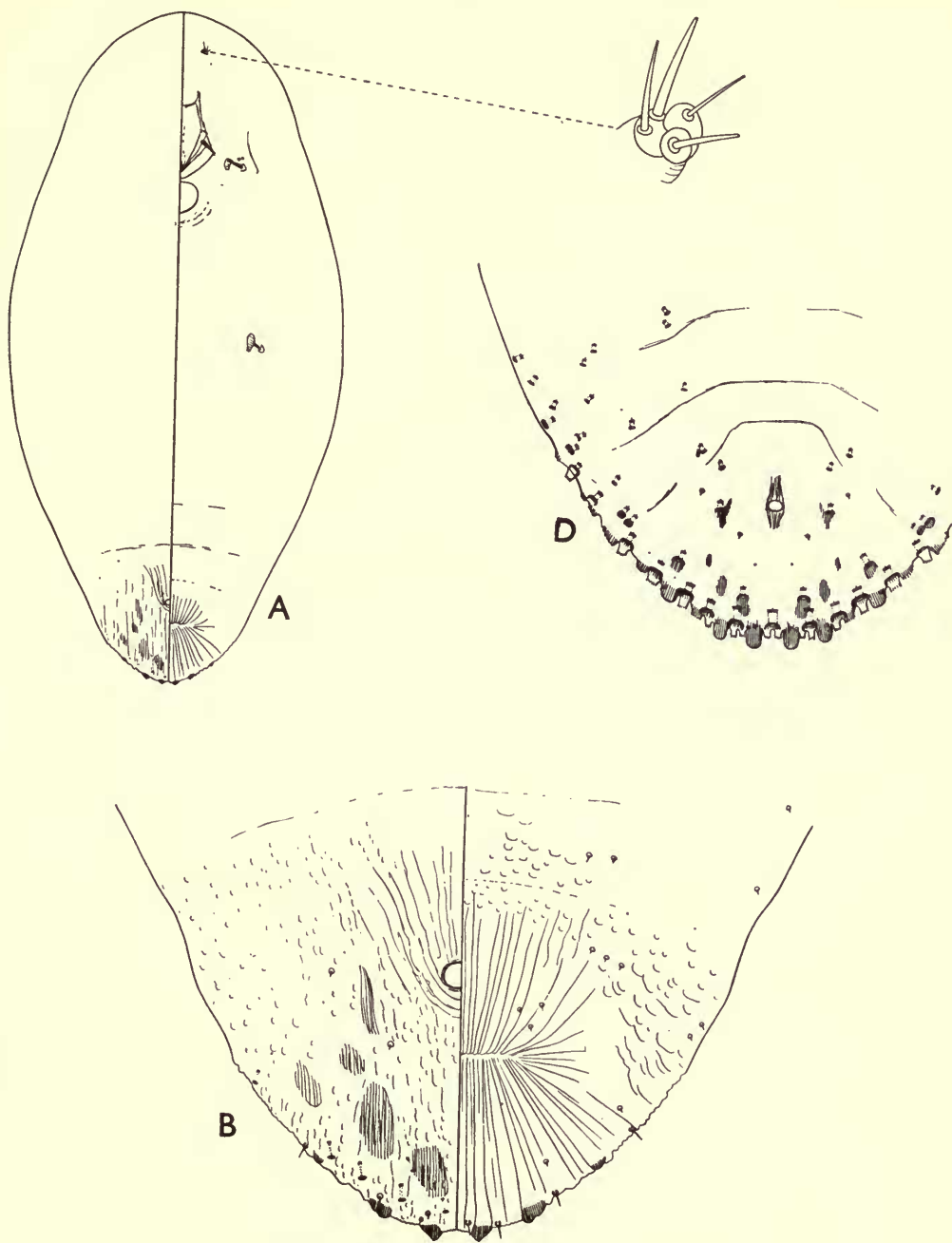
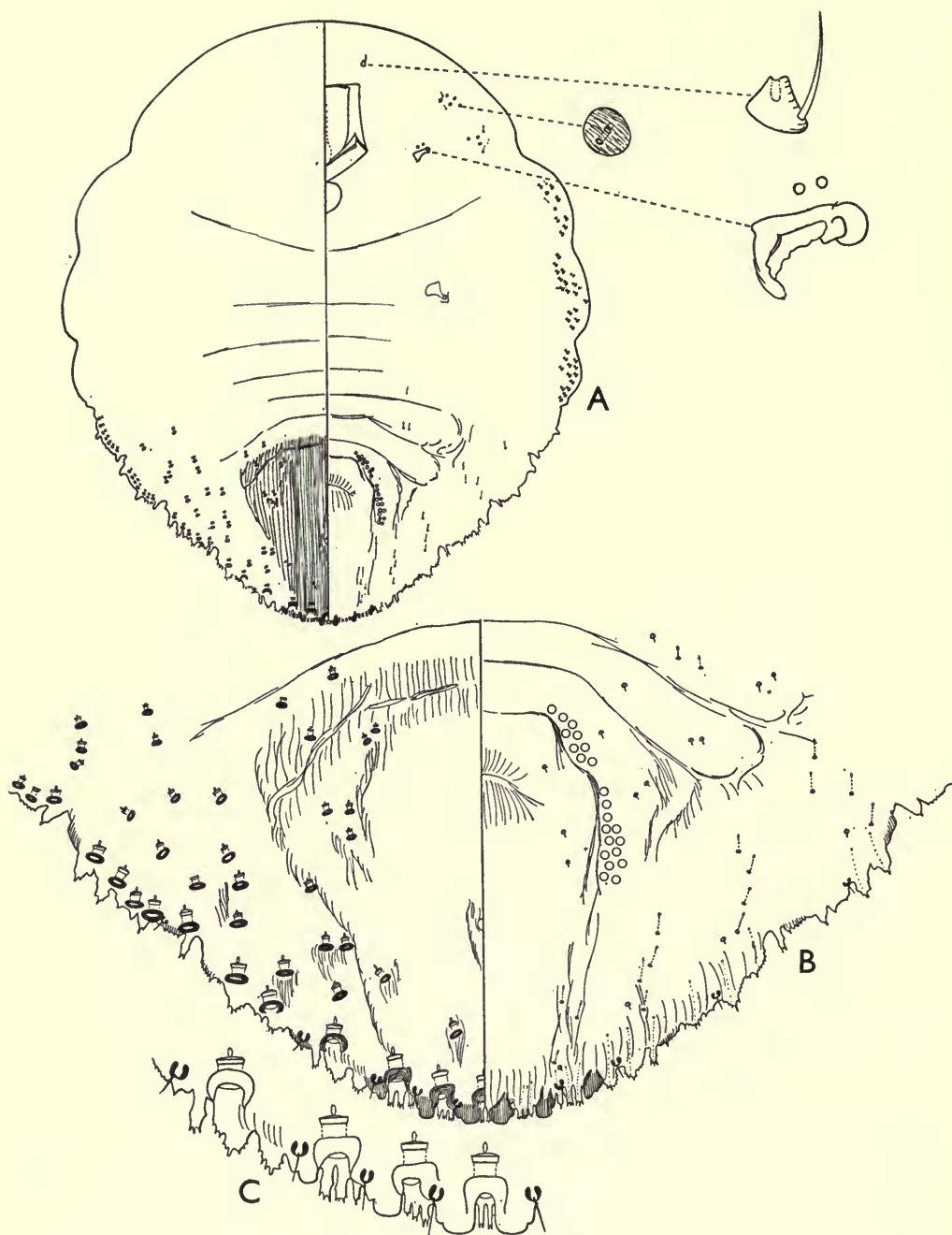


FIG. 6. *Leucaspis coniferarum* sp. n.

FIG. 7. *Parlatoria ghanii* sp. n.



*Parlatoria ghanii* sp. n.

(Text-fig. 7)

Only spirit material available. Female scale appearing white, broadly ovate with large pale brown exuviae, covered with a film of white secretory matter. Approximate length 1.1 mm., width 0.9 mm.

Male scale similar to that of the female but smaller and elongate.

Adult female on the slide broadly ovate, about 0.75 mm. long and 0.65 mm. wide. Anterior spiracle with 1-5 pores. Pygidium with 3 pairs of well developed flatly rounded lobes, median pair set close to each other with a macroduct between and once notched on their outer margins, second and third lobes of similar shape but successively smaller. Fourth lobes represented by small sclerotized spurs. Interlobular plates narrow, parallel sided and apically fimbriated; between the third and rudimentary fourth lobes 3 plates, 1 similar to the interlobular plates, the other 2 broad at the base, tapering, with distal half fimbriate. Beyond the rudimentary fourth lobes the plates are of the broad basal type. Anal orifice rather nearer to apex than base of pygidium; vulva towards base. Perivulvar pores in 4 groups: average of 5 examples, anterior pair, 11 (9-13); posterior pair, 12 (10-15). Dorsal submarginal macroducts on the pygidium fairly numerous, scattered, about 20 in number, extending as far as the second free abdominal segment. Three intermediate dorsal macroducts on segment 4 and with 5 on segment 5. Three small groups of ventral gland tubercles each with 2-5 tubercles, 1 on the mesothorax and the other 2 anterior to this. No trace of a derm pocket. Ventral surface of pygidium with only a few microducts. Three groups of tubular ducts laterally on the first free abdominal segment and the two segments anterior to it.

Holotype. ♀. PAKISTAN: Rawalpindi, on the branches and stipules of *Acacia modesta* (Leguminosae), 9.i.1961 (Comm. Inst. Biol. Control, Rawalpindi, No. 193).

Paratypes. PAKISTAN: 5 ♀, same data as holotype.

*P. ghanii* comes close to *P. fluggeae* Hall and *P. pittospori* Maskell. From *P. fluggeae* it differs in the shape of the pygidial lobes, the very much fewer pores associated with the anterior spiracles and in lacking the rows of intermediate dorsal macroducts on the third and fourth abdominal segments. From *P. pittospori* it differs in the shape of the pygidial lobes, the nature of the plates anterior to the third lobes and the comparative absence of tubular ducts on the first abdominal and second thoracic segments.

*Parlatoria serrula* sp. n.

(Text-fig. 8)

Characters of the scale not known.

Adult female when mounted broader than long, about 0.7 mm. broad by 0.6 mm. long. Anterior spiracles with 1-3 pores. Thoracic gland tubercles usually 3 only, between the anterior spiracles and margin. In the same vicinity but on the dorsal surface is an 8-shaped cicatrix-like structure one part of which is larger than the other. Pygidium broadly rounded with 3 pairs of lobes; median lobes broad at base, parallel sided over the basal half, with a small, triangular, apically rounded terminal half; second lobes of similar deeply notched form and very little smaller; third lobes smaller without a notch on inner edge but with 2 or 3 on outer margin. Plates broad and apically fimbriate; beyond the third lobes they are of finger-shape gland spine form. A single marginal macroduct between median lobes and 6 marginally on each side; all macroducts set at an angle of 45° to the margin. Submarginal macroducts on the pygidium usually limited to 2; ducts on the prepygidial segments few in number, smaller and confined to the margin. Perivulvar pores in 4 groups, anterior pair 7 in each, posterior pair 3. Anal orifice near centre of pygidium. The free abdominal segments each with a distinct submarginal boss dorsally on each side.

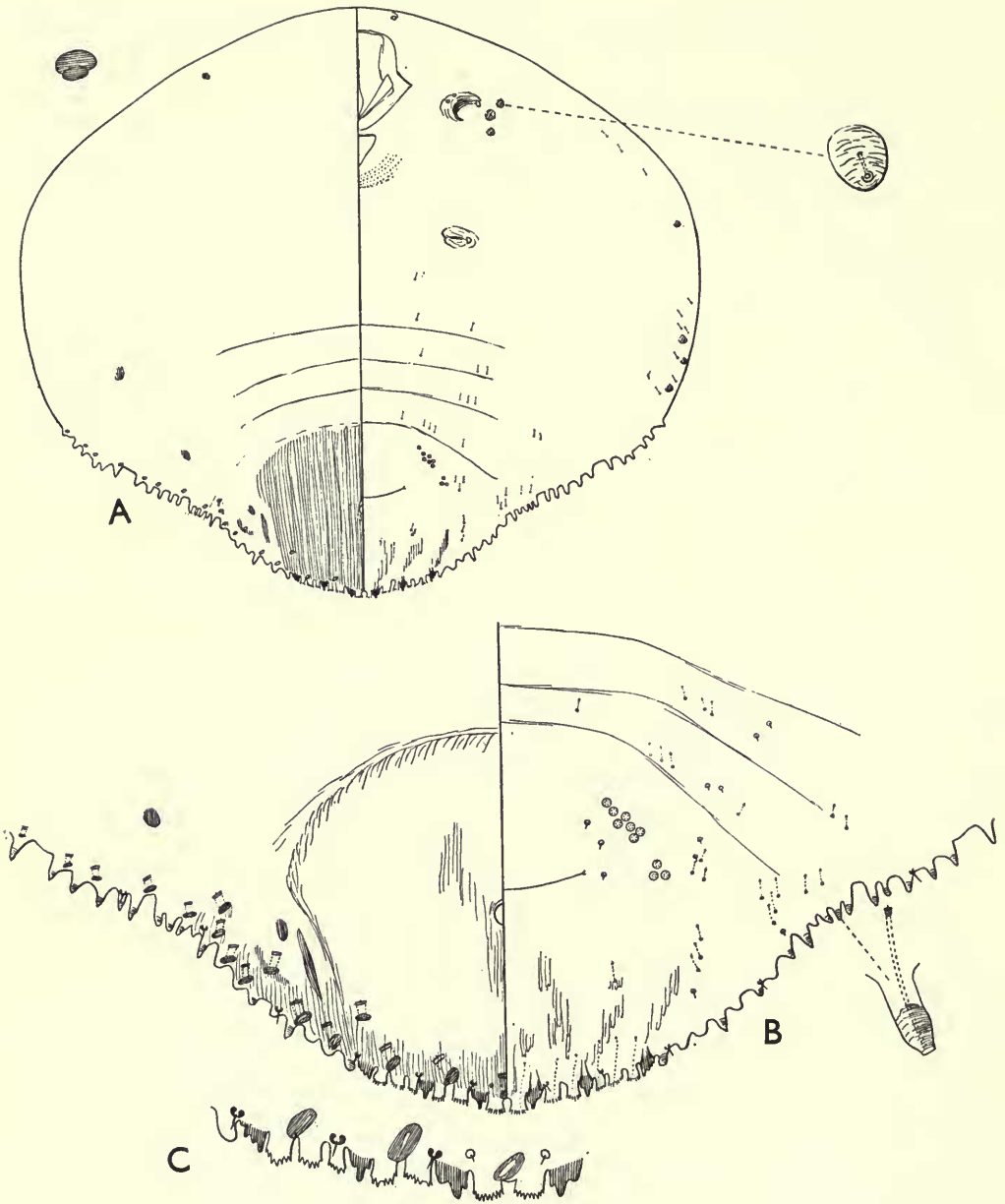


FIG. 8. *Parlatoria serrula* sp. n.

Holotype. ♀. CEYLON: Peradeniya, on *Cocos* sp. (Palmae), 6. ix. 1956 (B. *Manickavasagar*).

Paratypes. CEYLON: 2 ♀, same data as holotype.

Three specimens of *P. serrula* were found on some coconut material heavily infested with *Pseudococcus citriculus* Green. It is clearly not a typical *Parlatoria* but it is thought advisable to assign it to this genus until more is known of other closely allied genera. In some respects it bears a slight resemblance to *P. aonidiiformis* Green and *Parlaspis papillosa* (Green). It differs from both in the orientation of the pygidial marginal macroducts and the presence of bosses on the free abdominal segments. The pygidial lobes resemble those found in *Parlaspis papillosa* but this species has no cicatrix-like structure. In *Parlatoria aonidiiformis* the pygidial lobes are of different form and although it has one or two cicatrix-like structures on either side these are on the second abdominal segment and not in the vicinity of the anterior spiracles.

### *Aonidiella abietina* sp. n.

(Text-fig. 9)

Scale of the female circular, translucent, the body of the sublying female showing through; exuviae subcentral, pale brown or reddish brown. Diameter about 1.5 mm.

Male scale not seen.

Adult female heavily sclerotized at maturity and strongly reniform. Pygidium retracted, with lobes, paraphyses and plates as in *A. citrina* (Coquillet). Preulvar scleroses absent; prevulvar apophyses present. Dorsal ducts in 3 rather irregular rows on the pygidium and in addition a group of 8-10 similar ducts submarginally on each free abdominal segment. Perivulvar pores wanting. Ventral dermis of free abdominal segments with submarginal groups of microducts.

Holotype. ♀. PAKISTAN: Murree, on the needles of *Abies pindrow* (Pinaceae), 1. xi. 1961 (M. A. Ghani).

Paratypes. PAKISTAN: 9 ♀, same data as holotype; 7. xi. 1958, 5 ♀ (M. A. Ghani).

The specimen selected as holotype is a young adult female before sclerotization has set in.

This species is close to *A. aurantii* (Maskell) and *A. citrina* (Coquillet). It differs from both, however, in having groups of submarginal macroducts on the free abdominal segments and in having rather more ducts on the pygidium. It differs from *A. aurantii* further in lacking prevulvar scleroses and in the different shape of the prevulvar apophyses. It is also close to *A. messengeri* McKenzie described from the Ryukyu Islands and Taiwan but this species possesses prevulvar scleroses in addition to apophyses although they are variable and poorly developed; it has fewer pygidial macroducts and lacks submarginal macroducts on the free abdominal segments but it has a thoracic tubercle on either side of the body which are lacking in *A. abietina*.

### *Aspidiotus selangorensis* sp. n.

(Text-fig. 10)

Characteristics of the scales not known.

Body of adult female membranous, broadly ovate, about 0.9 mm. wide. Antennal tubercle with a single curved seta. Each spiracle surrounded by a well defined faintly sclerotized area.

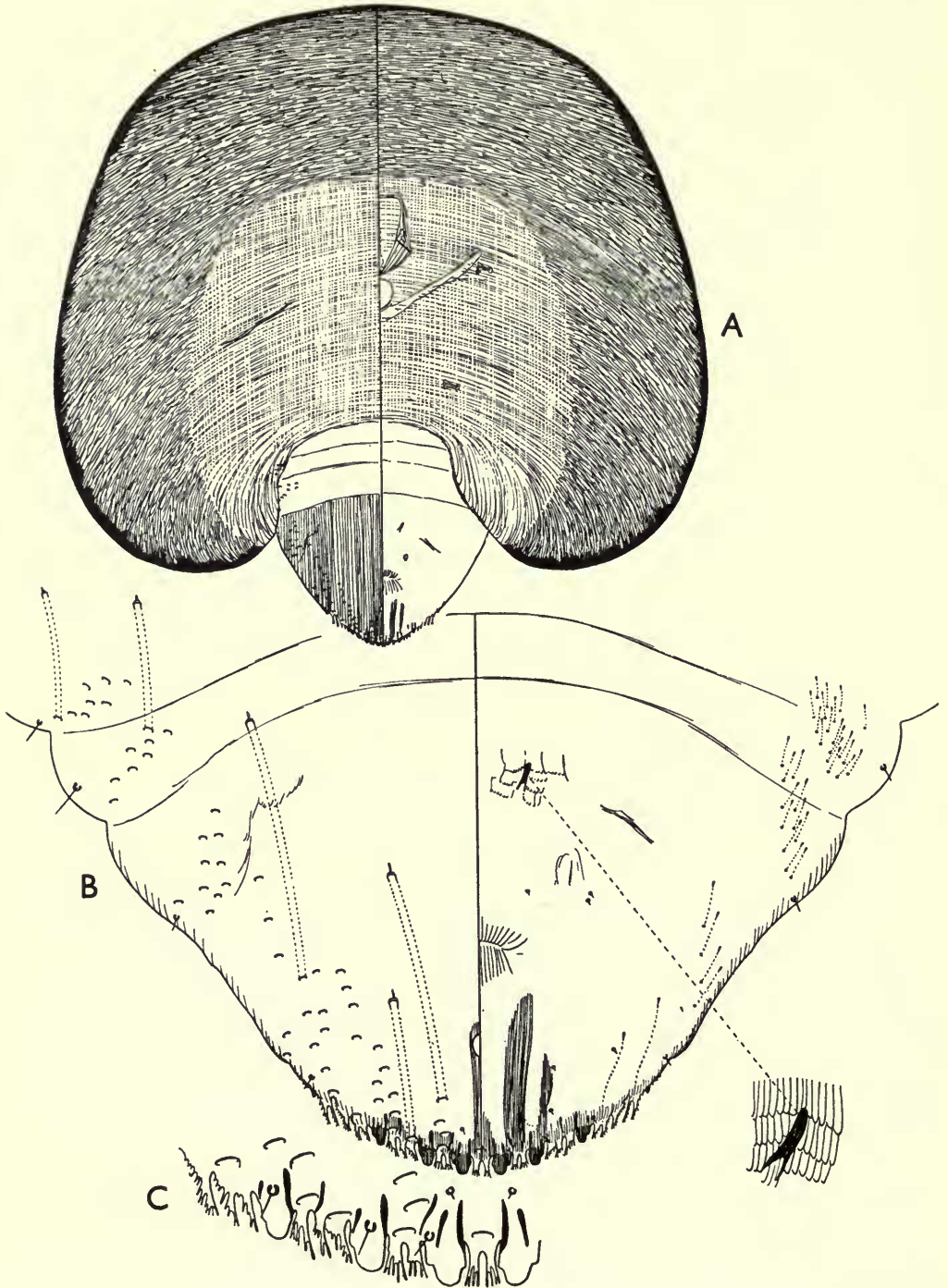
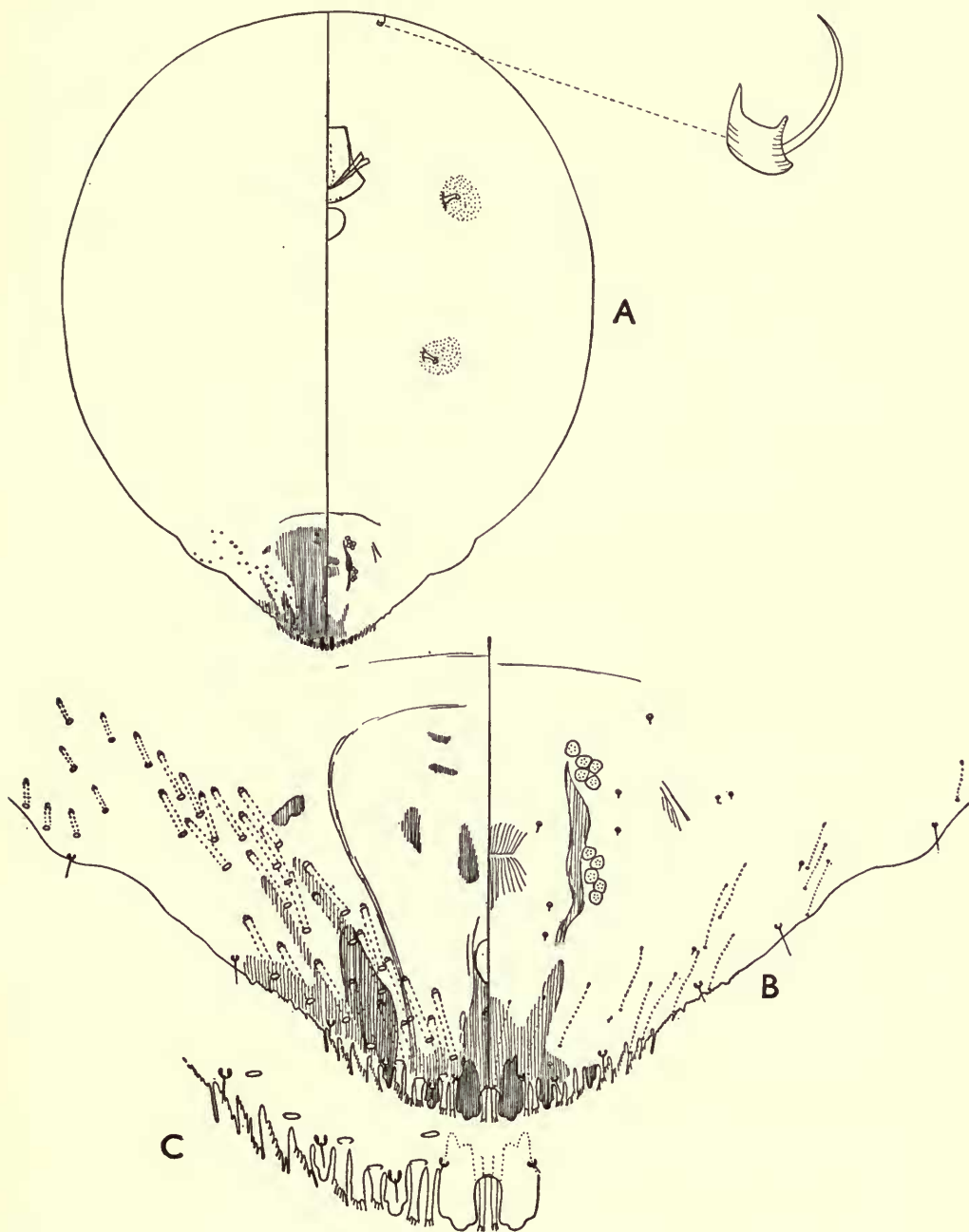


FIG. 9. *Aonidiella abietina* sp. n.

FIG. 10. *Aspidiotus selangorensis* sp. n.



Pygidium with 3 pairs of well developed lobes : median lobes set apart by a distance rather less than the width of one, longer than wide, rounded apically and notched on both inner and outer margins ; second lobes similar to median pair but smaller and third lobes similar but smaller again. Two plates between median lobes and between median and second lobes ; 3 between second and third and 5 beyond third lobes. All plates of the fringed type normal to the genus. Perivulvar pores in 4 groups each containing on the average 5 pores (range 2-8 in 8 examples). Anal orifice nearer apex than base of pygidium and set nearly 3 times its length from apex of pygidium. Dorsal ducts short, relatively numerous and scattered throughout the submarginal region as far as segment 3 ; with 2 or 3 ducts marginally on segment 3. Ventral surface of pygidium with a few submarginal microducts.

Holotype. ♀. MALAYA : Kuala Lumpur, on *Adiantum fergusonii* (Polypodiaceae), 1.vi.1926 (G. H. Corbett).

Paratypes. MALAYA : 7 ♀, same data as holotype.

*Aspidiotus selangorensis* is very close to *A. hederae* (Vallot) and *A. spinosus* Comstock but the pygidial ducts are longer than in *A. hederae* and shorter than in *A. spinosus*. The large, well defined, if faintly sclerotized areas around the spiracles are not found in either of the other two species. It differs further from *A. hederae* in having the pygidial lobes notched on their inner edges and from *A. spinosus* in possessing a larger anal orifice set further from the apex of the pygidium.

### *Chortinaspis fissurella* sp. n.

(Text-fig. 11)

Scale of adult female subcircular, moderately convex and dark brown in colour. Exuviae of a similar colour set within the margin but not central. Ventral scale thin but well developed. Diameter of scale about 1.0 mm.

Male scale not observed.

Adult female turbinate in form with membranous dermis. Antennal tubercles apparently set in shallow pits, each carrying a single stout curved seta. Anterior spiracles partly circumscribed by a loose arc of minute tubular ducts, posterior spiracles with a similar arc containing fewer ducts. Median pygidial lobes well developed, rounded apically, each falling away laterally, set close together and each with a prominent sclerotic basal projection. Other lobes wanting but margin of segments 6 and 7 with a somewhat castellated outline. Pygidium with small dorsal ducts set in furrows in a manner typical of the genus ; scattered ventral ducts occur submarginally on the pygidium and free abdominal segments. Anal orifice nearer apex than base of pygidium. Perivulvar pores wanting.

Holotype. ♀. PAKISTAN : Murree, on *Imperata cylindrica* (Gramineae), 25.ii.1960 (Comm. Inst. Biol. Control, Rawalpindi, No. 212).

Paratypes. PAKISTAN : 4 ♀, same data as holotype, Nos. 211, 212.

This species seems to belong quite definitely to the genus *Chortinaspis* but it differs in several respects from all the species at present placed in that genus. Like *C. consolidata* Ferris the pygidium of *C. fissurella* is entirely without plates and only the median lobes are represented. In *C. consolidata* these are fused whereas in *C. fissurella* they are separate even though they are very close together.



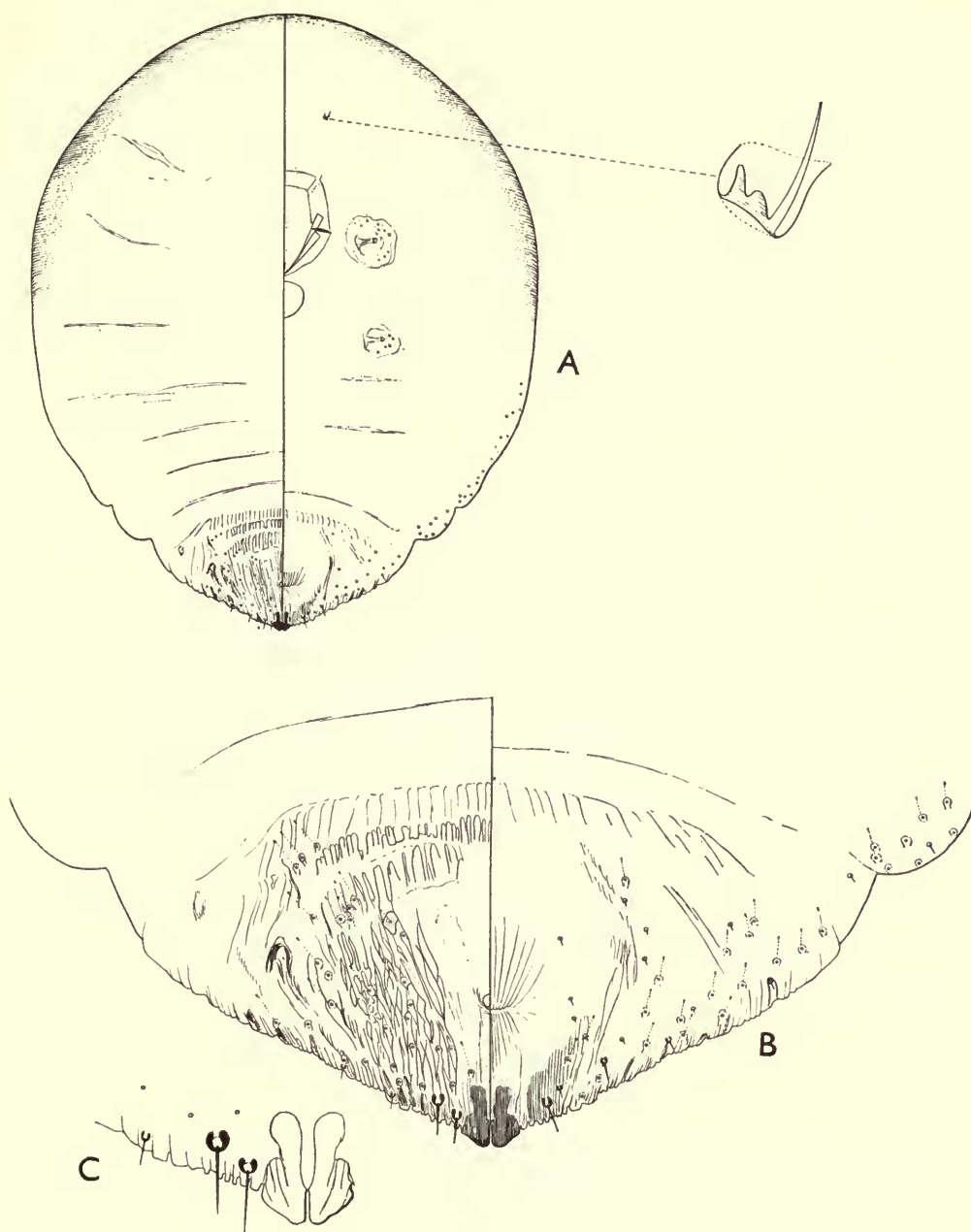


FIG. 11. *Chortinaspis fissurella* sp. n.

*Pseudaonidia corbetti* sp. n.

(Text-fig. 12)

Characters of the scale not known.

Body of the adult female when mounted 1.5–2.0 mm. long and 1.0–1.4 mm. wide, uniformly moderately sclerotized at maturity ; median dorsal areas of prepygidial segments transversely striated. Pygidium with 4 pairs of well developed lobes ; median pair large, squat, flatly rounded with faint notches on either side ; other lobes slender, as long as the median lobes but less than half their width, notched on both inner and outer margins ; second and third lobes much the same size as each other but fourth lobes smaller. Two plates between median lobes and between median and first lobes, 3 plates in the other 2 interlobal spaces ; all plates much the same length as the lobes, narrow, terminated by 3 or 4 finger-like processes. Short club-shaped paraphyses, not exceeding lengths of lobes, occur between the median lobes, 1 from the inner angle of each lobe and 1 each in the other 3 interlobular spaces on each side. Dorsal ducts very numerous submarginally on the prepygidial segments ; on the pygidium they are arranged in definite submarginal series. Dorsal central area of pygidium showing a conspicuous reticulate ornamentation. Perivulvar pores in 2 large groups each containing some 50 or more pores. Anal orifice small. Ventral surface with very few micropores.

Holotype. ♀. MALAYA : Balik Pulau, on *Myristica fragrans* (Myristicaceae), 17.vi.1927 (G. H. Corbett) (Dept. Agric., Kuala Lumpur, No. 3890).

Paratypes. MALAYA : 2 ♀, same data as holotype. MALAYA : Kuala Lumpur, on *Eugenia malaccensis* (Myrtaceae), 5 ♀, 7.x.1927 (Dept. Agric, Kuala Lumpur, No. 4173).

*P. corbetti* comes close to *P. paeoniae* Cockerell and *P. pavettae* described by Balachowsky (1953). It differs from both in the shape of the pygidial lobes, the nature of the lobes, the longer ducts on the pygidium and the presence of a pair of paraphyses between the median lobes. Subsequently Balachowsky (1958) transferred *P. pavettae* to *Duplaspidiotus*. The fact that two species as close as *P. paeoniae* and *P. pavettae* should be assigned to different genera indicates that there is no sharp dividing line between the two genera. A consideration of the types of the two genera suggests, however, that *P. corbetti* is nearer to that of *Pseudaonidia*, as is also *P. paeoniae*, and that *P. pavettae* could more properly remain in the genus *Pseudaonidia*. Apart from the paraphyses in these three species which are short, inconspicuous and quite unlike the typical conspicuously knobbed, large paraphyses of *Duplaspidiotus*, the pygidial lobes in number and shape, and the general facies, favour *Pseudaonidia* rather than *Duplaspidiotus*.

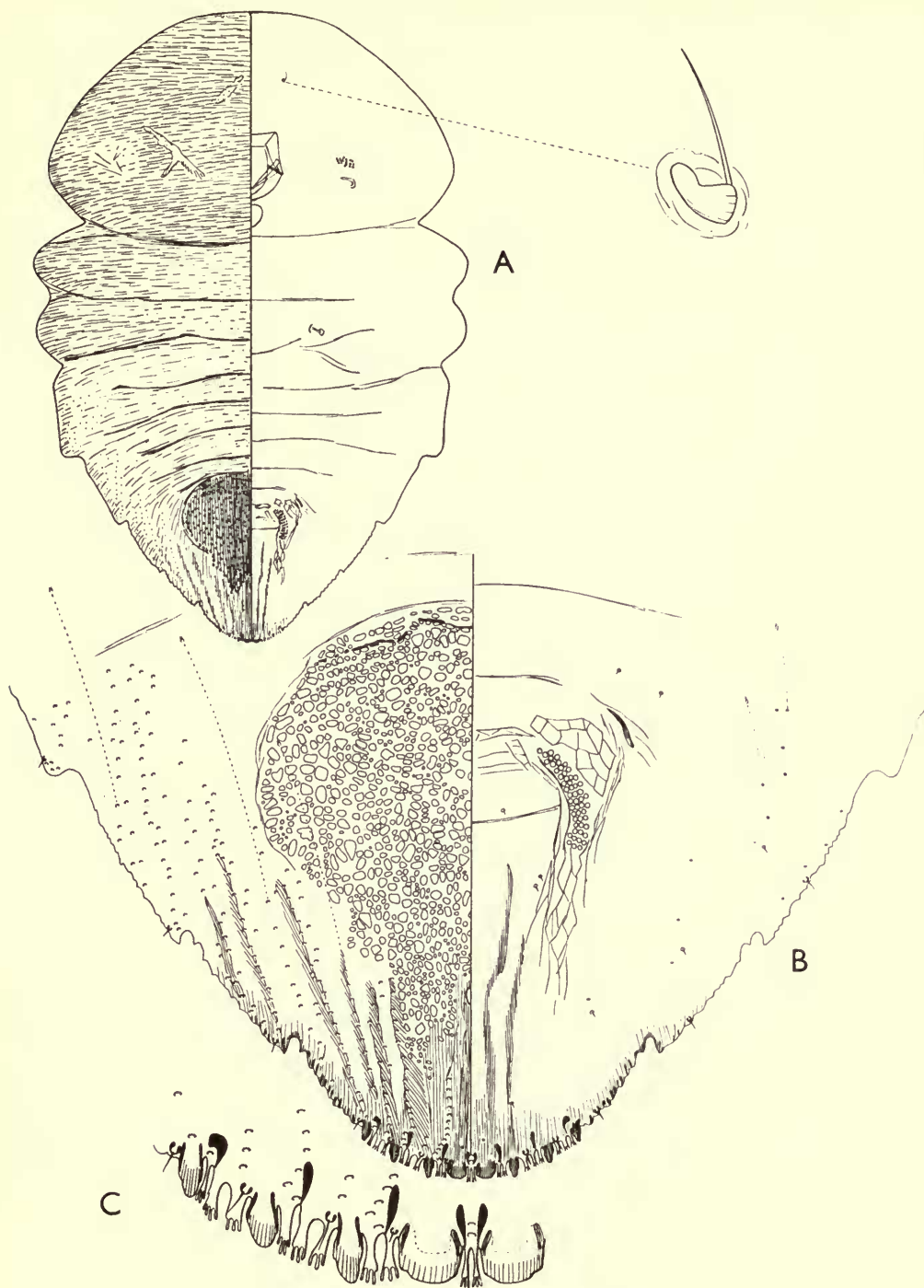
*Rhizaspidiotus marginalis* sp. n.

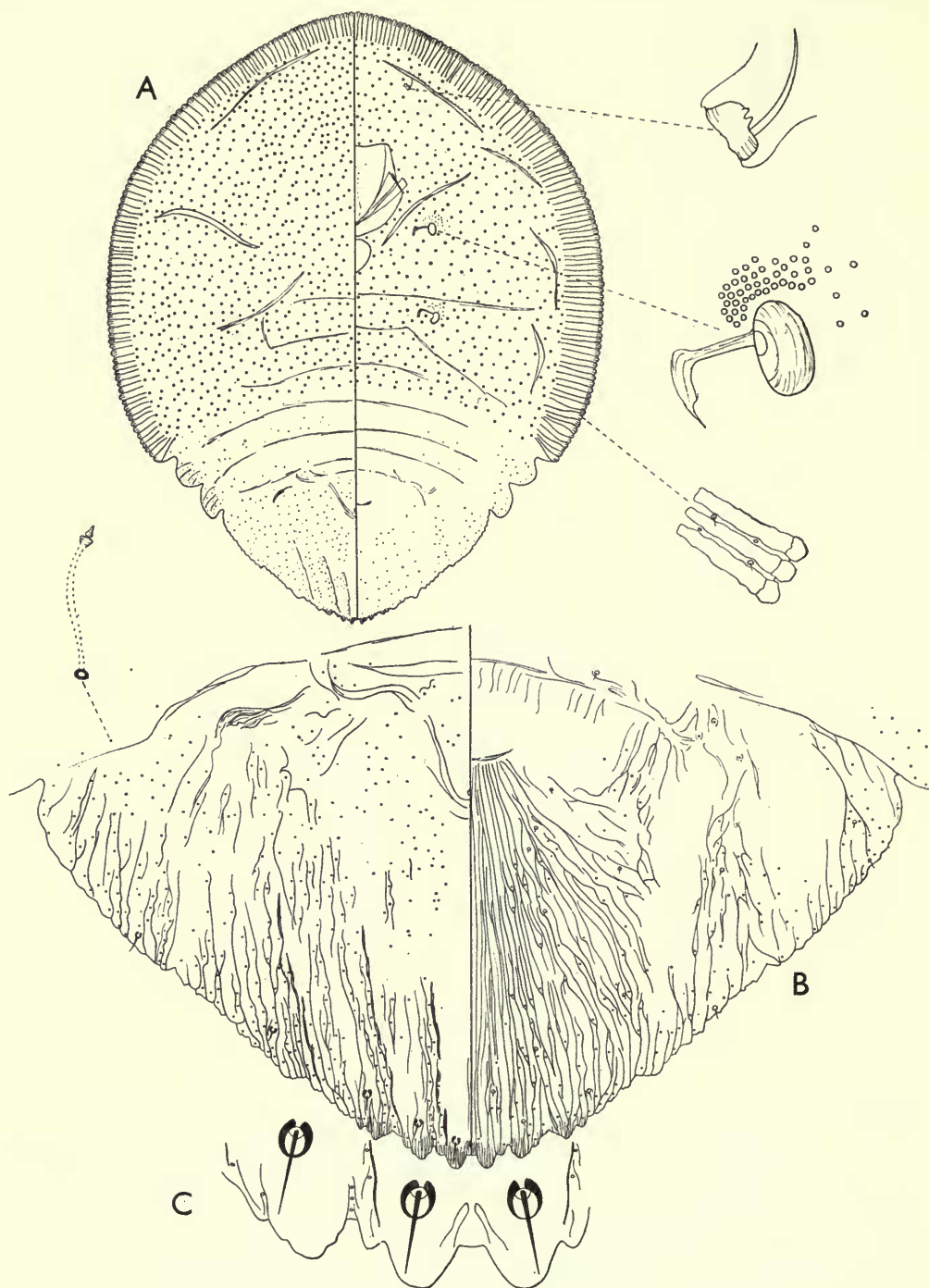
(Text-fig. 13)

Scale of adult female rather thick, more or less circular, white and low convex. Exuviae marginal, golden yellow or pale brown, coated with a film of white secretory matter. Ventral scale well developed, often remaining attached to the host plant. Diameter about 1.9 mm.

Male scale white and narrowly elongate oval.

Body of fully developed adult female broadly pyriform, about 2.8 mm. long and 2.1 mm. wide. Dermis of old adults sclerotized except for the second and third free abdominal segments and the anterior part of the pygidium which are less so. Antennal tubercles each carrying a single long curved seta. Anterior spiracles with a large group of pores about 50 in number ; posterior spiracles with rather fewer. Margin of body, anterior to first abdominal segment, with a conspicuous

FIG. 12. *Pseudaonidia corbetti* sp. n.

FIG. 13. *Rhizaspidiotus marginalis* sp. n.

uniformly wide band of striations; these striations or folds are set at right angles to the margin and give it a scalloped outline. Pygidium with 3 pairs of lobes; median pair dome-shaped with deep notches on inner and outer edges; second lobes only slightly smaller and of similar shape; third lobes slightly smaller again, bluntly pointed, lacking a notch on the inner margin. A single rather stout seta arising from the vicinity of the base of each lobe. Pygidium without plates or gland spines but with numerous folds and furrows running in from the margin of the pygidium and with numerous scattered minute one-barred ducts on both surfaces. Anal orifice very small, situated at base of pygidium.

Holotype. ♀. MALAYA: Kepong, on fruits of *Calamus* sp. (Palmae), 17.xii.1954 (Dept. Agric., Kuala Lumpur, No. 17993).

Paratypes. MALAYA: 17 ♀, same data as holotype.

The generic position of this species is not clear. In some respects it suggests a *Rugaspidiotus*, a genus which Ferris (1938) included in the Odonaspidini with some doubt. The present species, however, has not the bivalve type of exuviation characteristic of that genus. The presence of three distinct pairs of lobes, the median lobes being well separated from each other, and ducts that are clearly one-barred, favours the Aspidiotini rather than the Odonaspidini. It would appear to be more nearly congeneric with *Rhizaspidiotus* to which genus it is tentatively assigned. It differs, however, from all the known species of that genus and cannot be said to be very close to any one of them. It completely lacks pygidial plates and in this respect resembles *R. donacis* (Leonardi), *R. caraganae* (Kiritchenko) and *R. bivalvatus* Goux in which also the median lobes are distinctly separated, but it differs from these in the very striking ornamentation of all but the pygidium and abdominal segments and the relatively minute anal opening set towards the base of the pygidium.

Recently Mamet (1959) described a new genus, *Antakaspis*, from Madagascar for which he erected a new tribe. This is said to possess some of the characteristics of the Odonaspidini but is related to the Diaspidini by virtue of its method of exuviation and the presence of two-barred ducts and one of the characters of the tribe is the occurrence of pygidial lobes in the adult and second stage female. There are some species of *Odonaspis*, however, with equally well developed lobes. *R. marginalis* bears some resemblance to *Antakaspis terminaliae* Mamet but differs in having one-barred ducts and in lacking pygidial paraphyses.

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